

REMARKS

Claims 1 and 4-7 are pending in the present application, and are rejected. Applicants traverse the rejections without amendment of the claims.

Claim Rejections - 35 U.S.C. §112, first paragraph

Claims 1 and 4-7 are rejected under 35 U.S.C. §112, first paragraph as being unsupported by the original specification.

The Examiner asserts that there does not appear to be a written description of non-self-vulcanizing rubber and 0% crosslinking agent in the application as originally filed. The Examiner asserts that Applicant has not pointed to any portion of the specification, and Examiner has not found any support for this phraseology in the specification as originally filed.

Applicants respectfully disagree with the above rejection. Applicants submit that they have merely rendered explicit what was implicit in the specification and original claims: that the unvulcanized rubber is neither originally nor eventually crosslinked, and that the composition including the unvulcanized rubber does not contain any crosslinking agent for rubber.

Applicants note that the original specification starting on page 10, line 5 indicates that, "The unvulcanized rubber, or rubber which is not crosslinked, in the composition for the non-asbestos-based friction material of the present invention is at least of one type selected from the group consisting of natural rubber, isoprene rubber (IR), nitrile/butadiene rubber (NBR), styrene/butadiene rubber (SBR), butadiene rubber (BR), chloroprene rubber (CR), butyl rubber

(IIR), ethylene/propylene rubber (EPM or EPDM), urethane rubber, silicone rubber, fluorine rubber and acrylic rubber...".

As noted in the first sentence in the paragraph above, the specification makes clear that the term "unvulcanized" as it pertains to the claimed rubber has the same meaning as "not crosslinked". The language in the cited Yamane et al. similarly makes clear that the terms are used interchangeably, as noted in column 6, lines 10-27, wherein it is disclosed that,

When the rubber composite material particles of the invention are mixed into the friction material composition, addition and mixture of the particles into the composition is preferably carried out with the rubber within the rubber composite particles in an *uncrosslinked (unvulcanized) or semi-crosslinked (semi-vulcanized)* state and together with a *vulcanizing agent (crosslinking agent)* such as sulfur. Subsequently molding and postcuring (heat-treating) the friction material composition makes it possible to *crosslink (vulcanize)* the rubber composite particles, resulting in closer adhesion with the other constituents. The vulcanizing agent is generally added in an amount of from 0.05 to 20% by weight, based on the rubber composite particles, although the addition of a *vulcanizing agent (crosslinking agent)* may be omitted where use is made of a *self-crosslinking (self-vulcanizing)* rubber. In some cases, the rubber composite particles may first be *crosslinked (vulcanized)*, then added and into the friction material composition.

(Emphasis added.)

Thus, it is clear that it is common in the art to interchange the terms “vulcanizing” and “crosslinking”, and since the presently claimed material was originally defined as non-vulcanized, the presently claimed material is both non-vulcanized and non-crosslinked.

Furthermore, the original specification indicates on page 8, lines 8-24 that,

The inventors of the present invention consider the following mechanisms to be those by which the filler (C) exhibits its function...

A friction material incorporated with abrasive particles *but not unvulcanized rubber* tends to have deteriorated properties with respect to wear resistance and attack on counter surface, although it exhibits a high coefficient of friction.

...

On the other hand, a friction material incorporated with abrasive particles and *unvulcanized rubber* simultaneously has lower counter surface attack and improved wear resistance, the former conceivably resulting from the *unvulcanized rubber covering the abrasive particles and keeping them unexposed to the friction material surface, thus reducing their abrasive actions,* and the latter conceivably *from a lubricating phenomenon between the abrasive particles and the unvulcanized rubber.*

(Emphasis added.)

Thus, the specification makes clear that the unvulcanized rubber remains unvulcanized through production and during the use of the friction material, even though the material is cured. There is clearly no crosslinking (vulcanizing) of the rubber during its production or prior to use

of the friction material, even after the curing step. It follows that the inventive rubber neither contains a crosslinking agent, nor can the rubber be a self-crosslinking material.

Therefore, the claim language of a friction material containing “unvulcanized non-self-vulcanizing rubber which is not crosslinked...and wherein said friction material comprises 0% of a crosslinking agent for rubber” is clearly supported by the specification as filed.

Applicants therefore traverse this rejection.

Claim Rejections - 35 U.S.C. §103(a)

Claims 1 and 4-7 are rejected under 35 U.S.C. §103(a) being unpatentable over JP 56-002325 (full language translation) in view of Tabe et al. (US 4,324,706) and/or Yamane (US 6,451,872).

The Examiner asserts that JP 56-002325 discloses a friction material (i.e., fibrous base); a thermosetting resin (i.e., binder); (page 3 line 1-2); an inorganic filled substance such as barium sulfate, silica, calcium carbonate, and graphite and metal powders; and an unvulcanized rubber such as natural rubber, styrene rubber, nitrile rubber, and chloroprene rubber (page 3 lines 1-11).

Applicants respectfully disagree with the rejections above, and submit that the cited reference fails to teach or suggest all of the claimed limitations, as noted below.

As a result of the previous amendment, the non-asbestos-based friction material of the present invention contains an unvulcanized, non-self-vulcanizing rubber which is not crosslinked. The above claims language means that the rubber contained in the final friction material of the present invention remains unvulcanized and non-crosslinked.

Applicants note that the use of such rubber is extremely important in the present invention, and such importance is highlighted in the original specification. As described in paragraph [0038] of the publication of the present application, in a friction material into which an unvulcanized rubber and abrasive particles are incorporated, the unvulcanized rubber covers the abrasive particles and keeps them *unexposed* to reduce their abrasive actions. As a result, the friction material exhibits lower counter surface attack. Further, lubricating phenomenon between the abrasive particles and unvulcanized rubber brings improved wear resistance of the friction material.

Applicants note that these effects can be obtained only by the use of an unvulcanized or non-crosslinked (in other words, non-cured) rubber; vulcanized or crosslinked (cured) rubber does not bring these effects.

The cited JP document fails to teach or suggest the claimed limitation with respect to the unvulcanized rubber.

As the Examiner states, an unvulcanized rubber is used for producing the friction material of JP 56-002325 (JP '325). However, claim 2 of JP '325 clarifies that this unvulcanized rubber is used as an organic binder. Applicants submit that a person skilled in the art would immediately know that the binding function is imparted to the rubber **only upon vulcanization or crosslinking**.

Furthermore, the examples of JP '325 strongly suggest vulcanization or crosslinking of the rubber during the production of the friction material.

Applicants note that Example 1 uses hexamethylenetetramine and Example 2 uses formaldehyde. Each of these compounds is generally used as a vulcanization accelerator. Further, Example 2 uses phthalic acid, which is generally used as a scorch retarder. These facts clearly show that appropriate vulcanization or crosslinking of rubber is intended and achieved in Examples of JP '325.

Therefore, in the friction material of JP '325, the rubber must be vulcanized or crosslinked, so that the above-mentioned lower counter surface attack or improved wear resistance cannot be not achieved in JP '325.

Applicants note that the other references do not disclose or suggest the use of an unvulcanized or non-crosslinked rubber.

As apparent from the above, the cited references do not teach or suggest the essential features and the unexpected effects of the present invention. Therefore, the present invention would not have been obvious even to a person skilled in the art from the cited references in any combination.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

Application No. 10/724,366
Attorney Docket No. 032126

Response under 37 C.F.R. §1.116
Response filed October 23, 2007

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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